Crane on call:

How to deal with repair of offshore wind turbines

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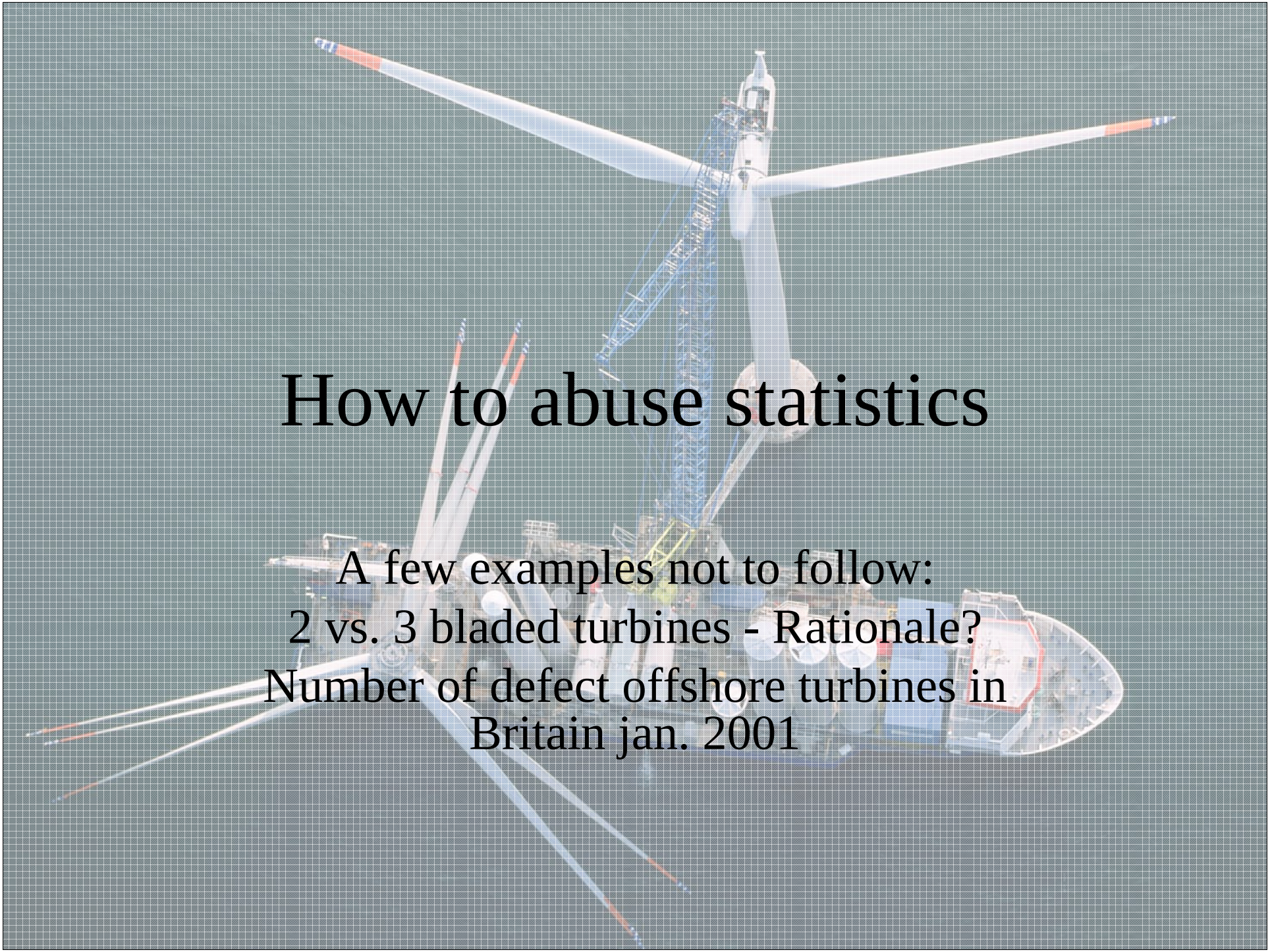
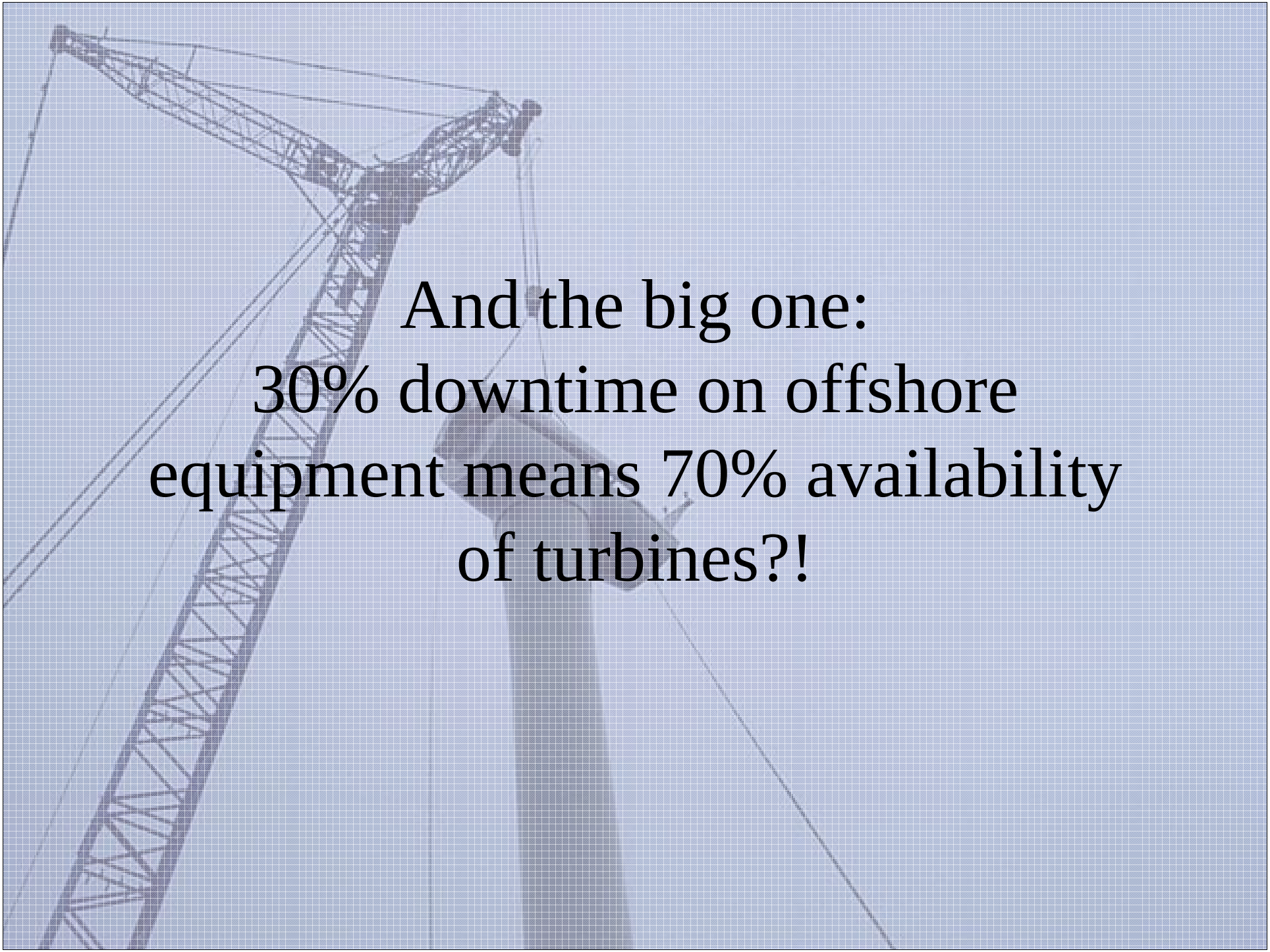


How to abuse statistics

A few examples not to follow:

2 vs. 3 bladed turbines - Rationale?

Number of defect offshore turbines in Britain jan. 2001



And the big one:
30% downtime on offshore equipment means 70% availability of turbines?!

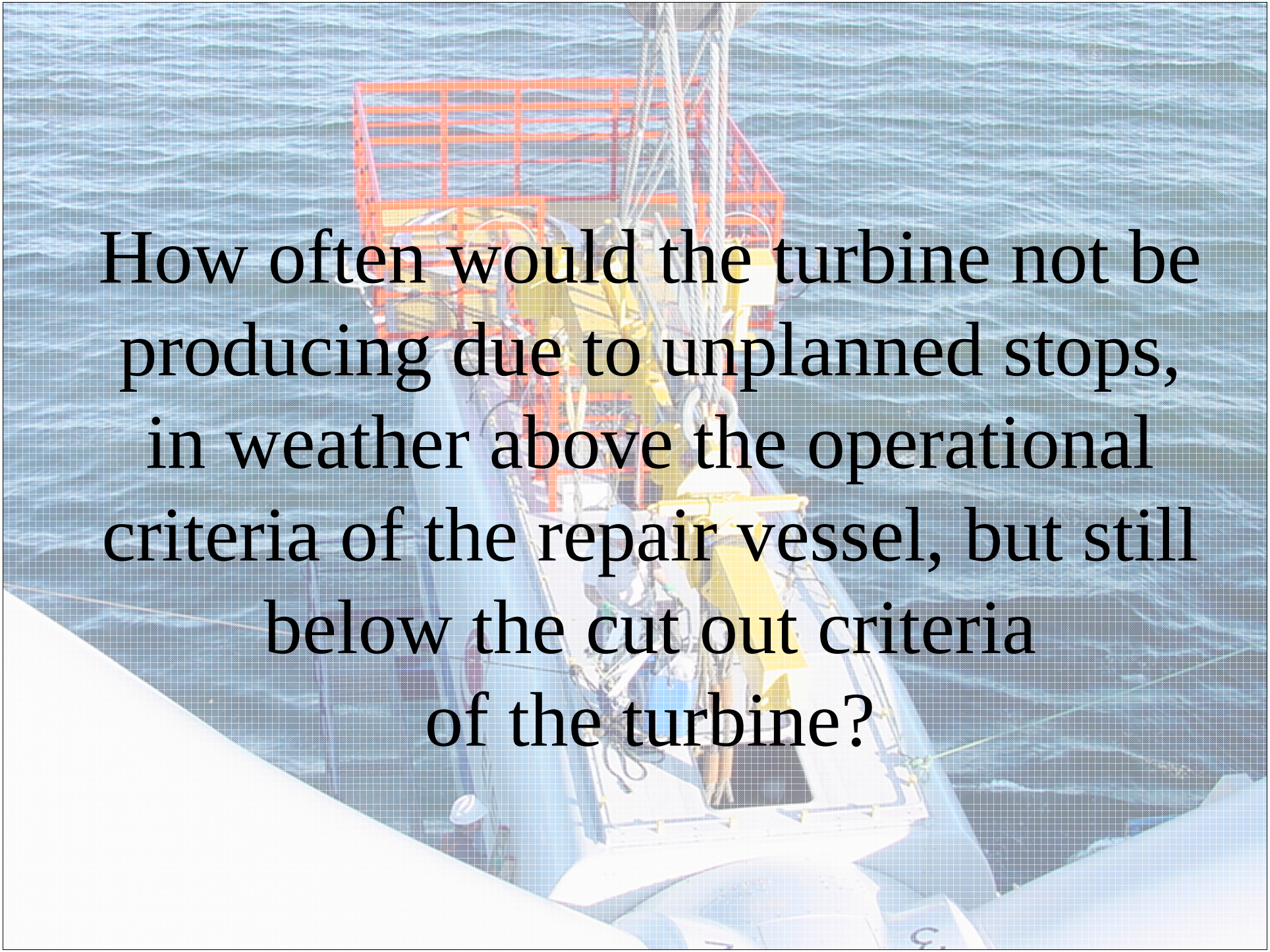
The practical unscientific approach

How do we see the world?

What are the criteria?

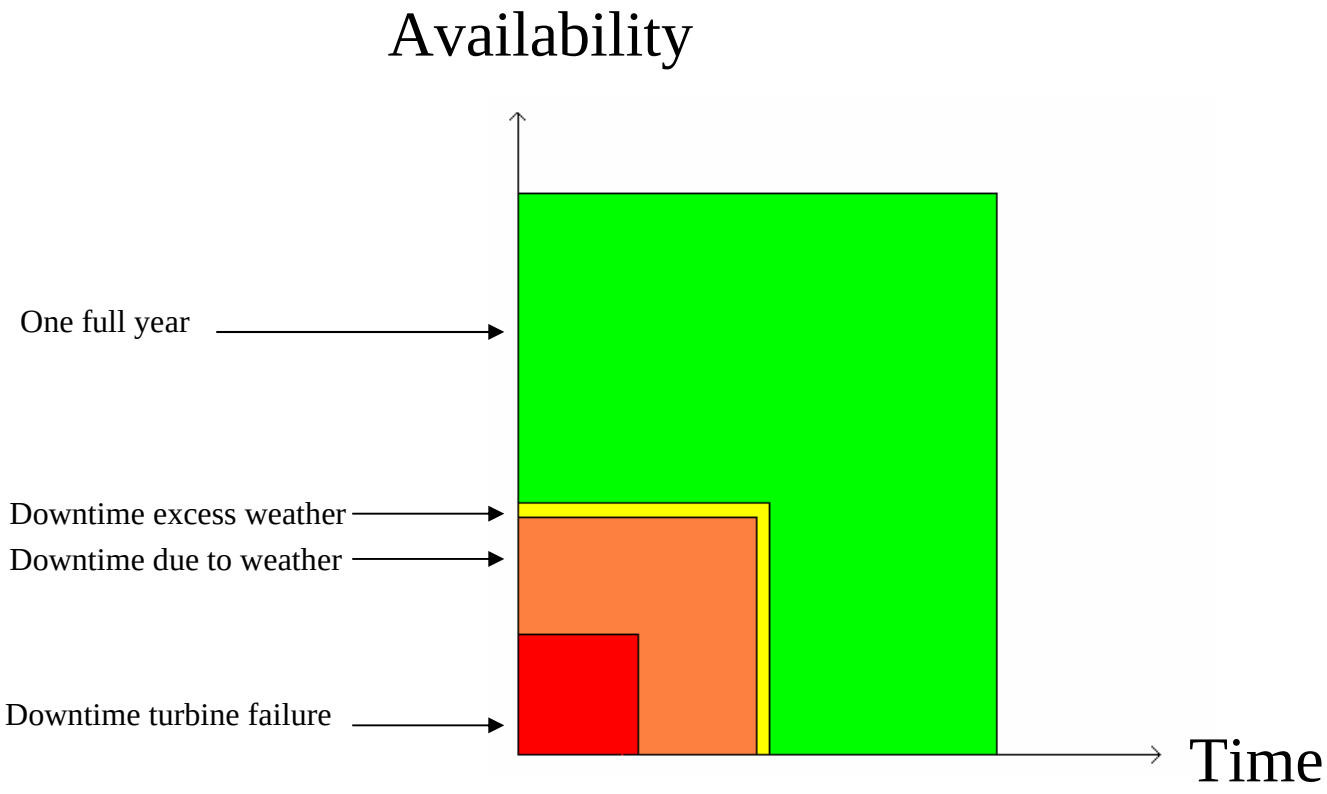
- Based on a full year we can say that:
- There is 30% downtime on equipment
- There is 7.5% downtime on the turbine
- There is 5% of weather downtime where the turbine could not produce due to weather

- So in actual fact:



How often would the turbine not be producing due to unplanned stops, in weather above the operational criteria of the repair vessel, but still below the cut out criteria of the turbine?

Graphical visualisation



The answer:

Worst case 7.5%

Best case: 2.5% or 97.5% availability

But:

In terms of equipment it doesn´t matter, because:

The downtime is governed by the availability of spare parts!

The vessels have a much higher availability offshore than anticipated – eg. In 2004 our vessels were occupied 85% of the year offshore!

Interest for the participants

	Owners	Manufacturers	Insurance
Production	High	High	High
Operational cost	Low	Low	Low
Risk of lost production	Low	Low	Low
Insurance	Low premium	Low premium	Low payout
Availability	High	High	High

Turbines offshore are increasing in number every year

- Denmark 180+ Heading for 300+
- UK 120+ Heading for 1000+
- Sweden 12 Heading for 300+
- Holland 36 Heading for 100+
- Germany
- France
- Etc.

Conclusion

Need for a repair solution because:

- Number of offshore turbines is increasing
- Market for suitable equipment is small
- Cost of equipment is governed by increasing demand

3 main areas of interest

- Personel transfer :

  A2SEA provides solutions

- Vessel for O&M of offshore turbines :

  A2SEA is currently developing this solution

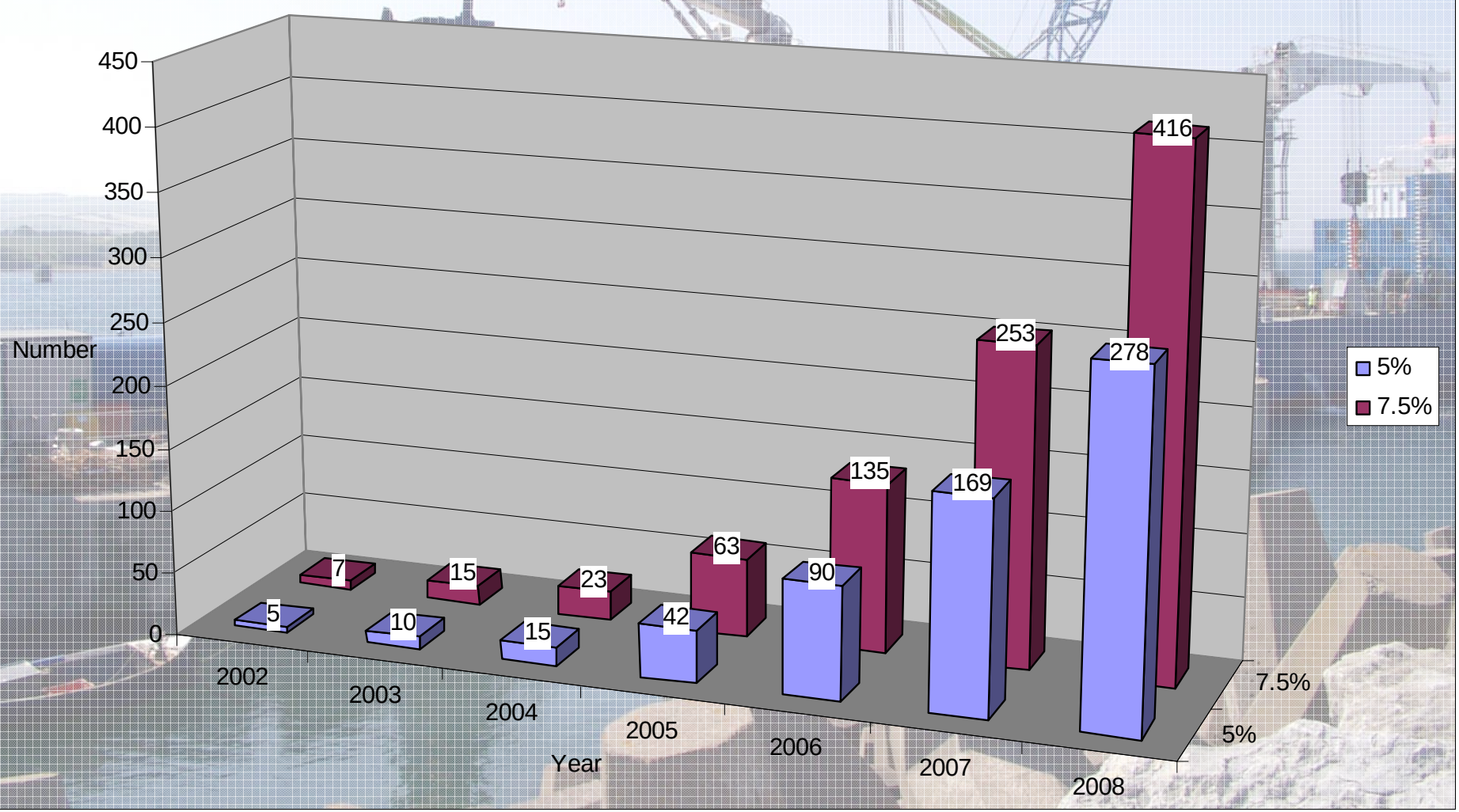
- Repair vessel for offshore turbines :

  A2SEA offers solution as presented today

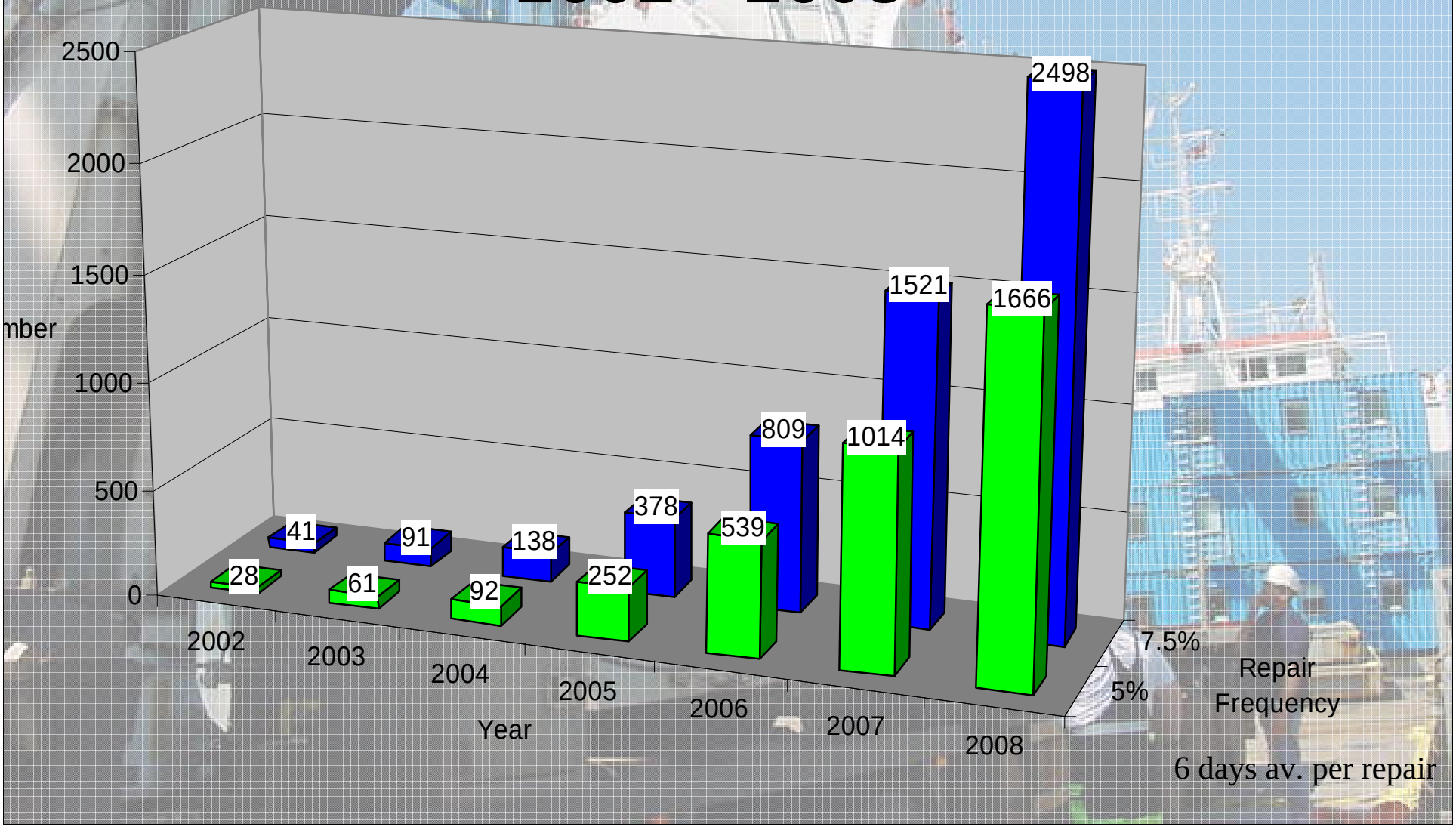
O&M solution

- Crew and equipment transport with self propelled self elevating platform
- Planned maintenance and small repairs with internal crane
- Small components dropped on platform and crew facilities on service vessel

Expected replacement of main components 2002 - 2008



Expected number of repair days 2002 - 2008



6 days av. per repair

Offshore work

Specific requirements:

- Safety
- Speed
- Cargo capacity
- Availability
- Price
- Weather criteria for work

Offshore repair

- Availability to mobilize at short notice
- Flexibility to adapt equipment to job
- Approval to travel to site unhindered
- Ability to load and travel with any component
- Ability to plan operations at short notice
- Ability to accomodate repair crew

Drivers of financial exposure

- Availability of craft
- Suitability of craft
- Operational speed + actual time on site
- Downtime on turbine

The A2SEA system

- Dedicated stand by repair vessel
- Structured planning of repairs
- Based on first come first served
- On site within 14 calendar days
- Loading/offloading parts in home port

Repairs covered

- Blades
- Gearboxes
- Main shafts
- Nacelles
- Rotors
- transformers

Pricing structure for turbine repair

- Fixed annual fee

  Fixed dayrate and mob/demob cost

  Fixed but reduced annual fee with added dayrates

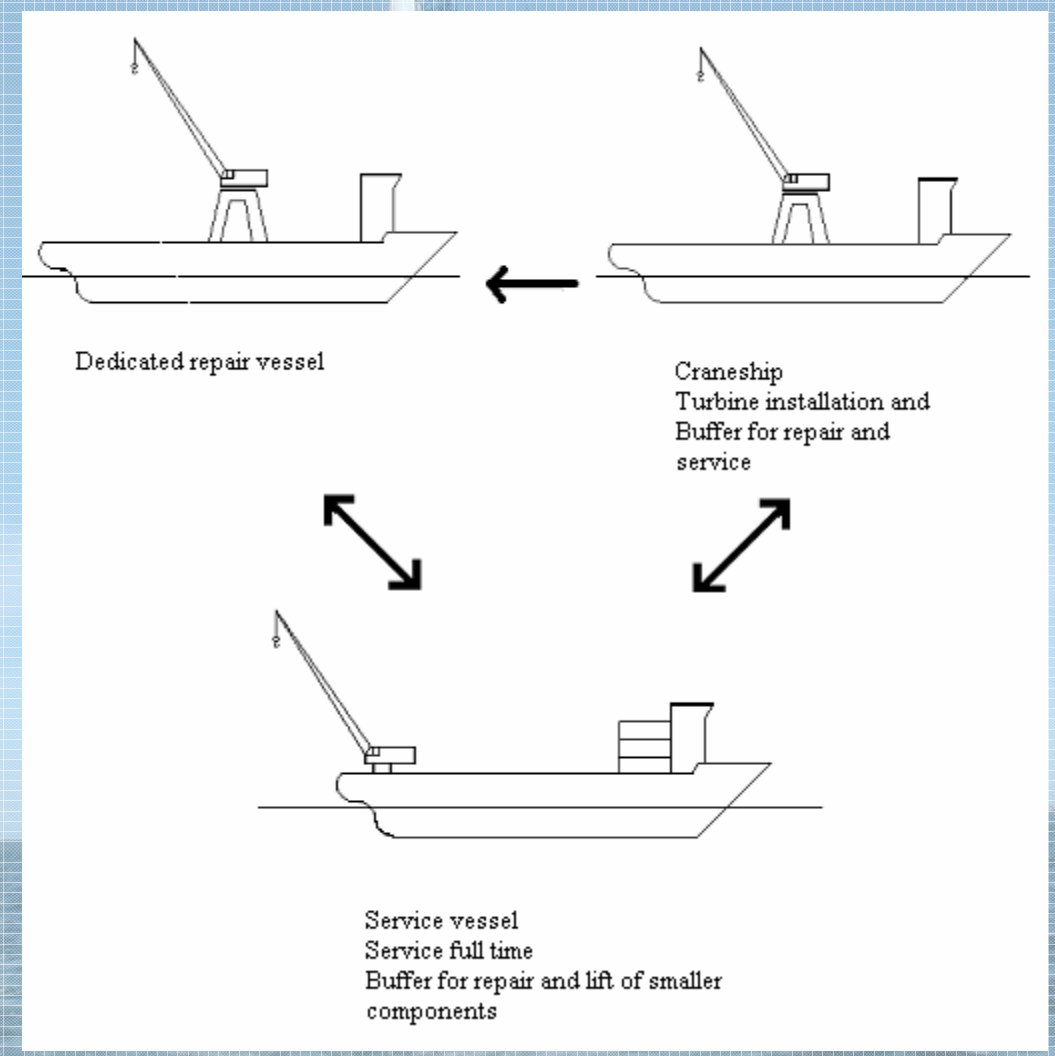
  Weather risk included

Equipment

- Dedicated crane vessel
- Accomodation for clients crew max. 15 persons
- Fitted with suitable crane
- Fitted with legs

- Normal operational criteria of crane vessel apply

System interaction



Advantages

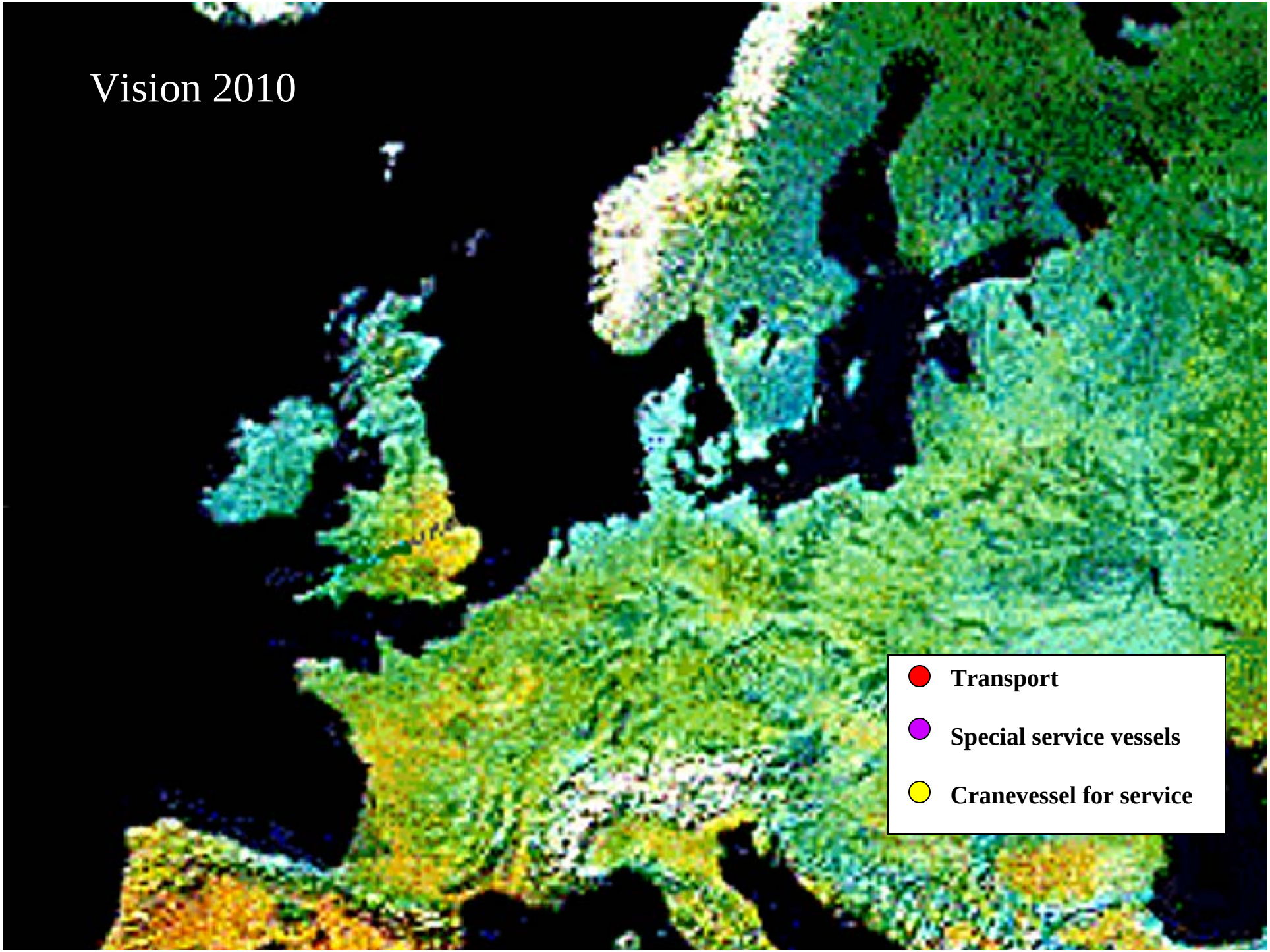
- Price
- Time
- Exposure known
- Time consumption
- Planning, Manning
- Warehousing an extra option
- Only unknown is number of defects

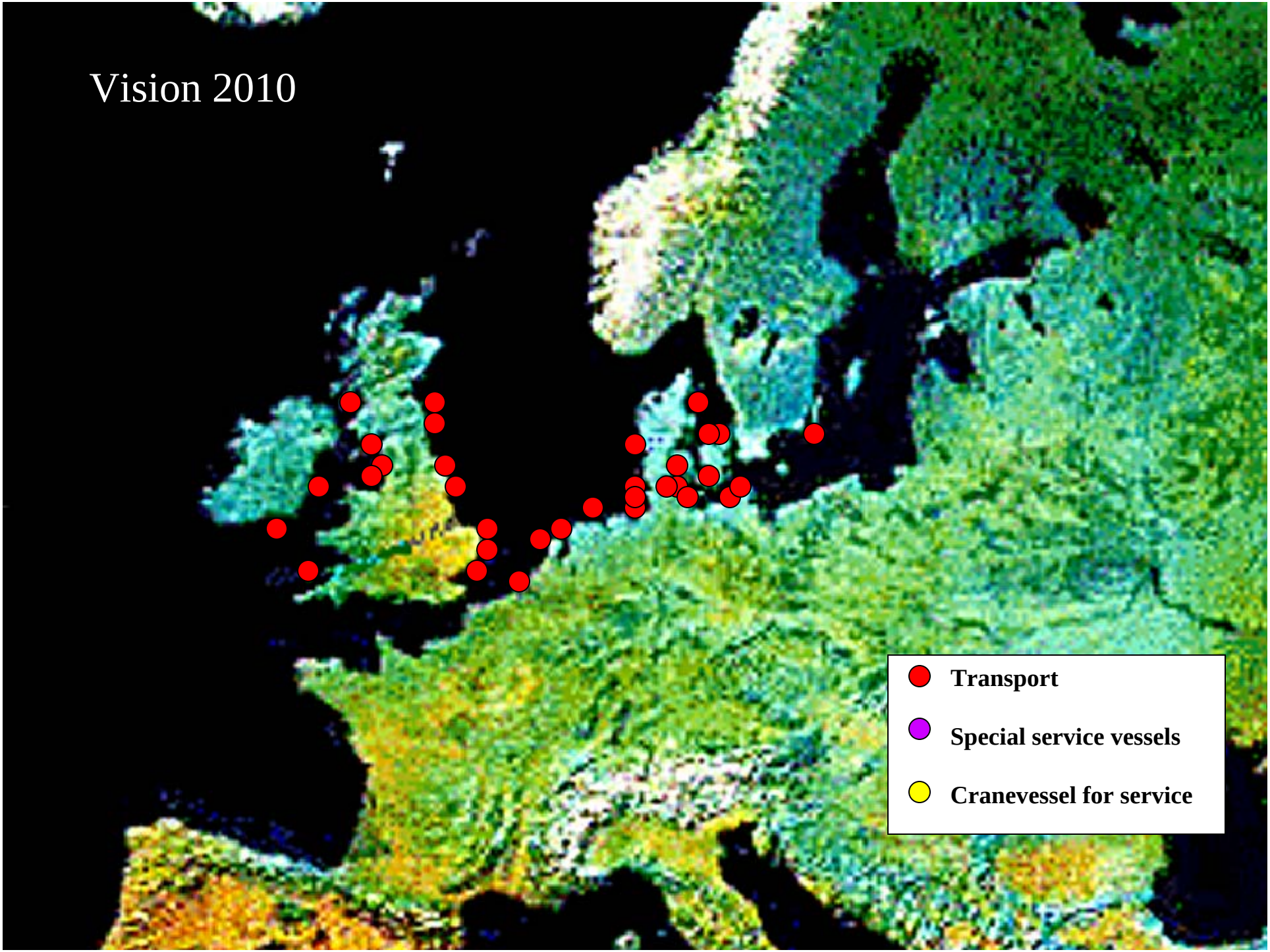
Possibilities

- Cut in cost to near onshore level
- 100% availability of vessel
- No unknown exposure
- Expert partners
- Added value by offering other services such as warehousing of parts

The solution?

• Cost	• Low fixed
• Production	• Maximized
• Risk	• Minimized
• Premium	• Reasonable
• Availability	• Highest possible
• Safety	• Excellent record
• Speed	• Unrivalled
• Knowledge	• Broadest experience


Vision 2010
Transport
Special service vessels
Cranevessel for service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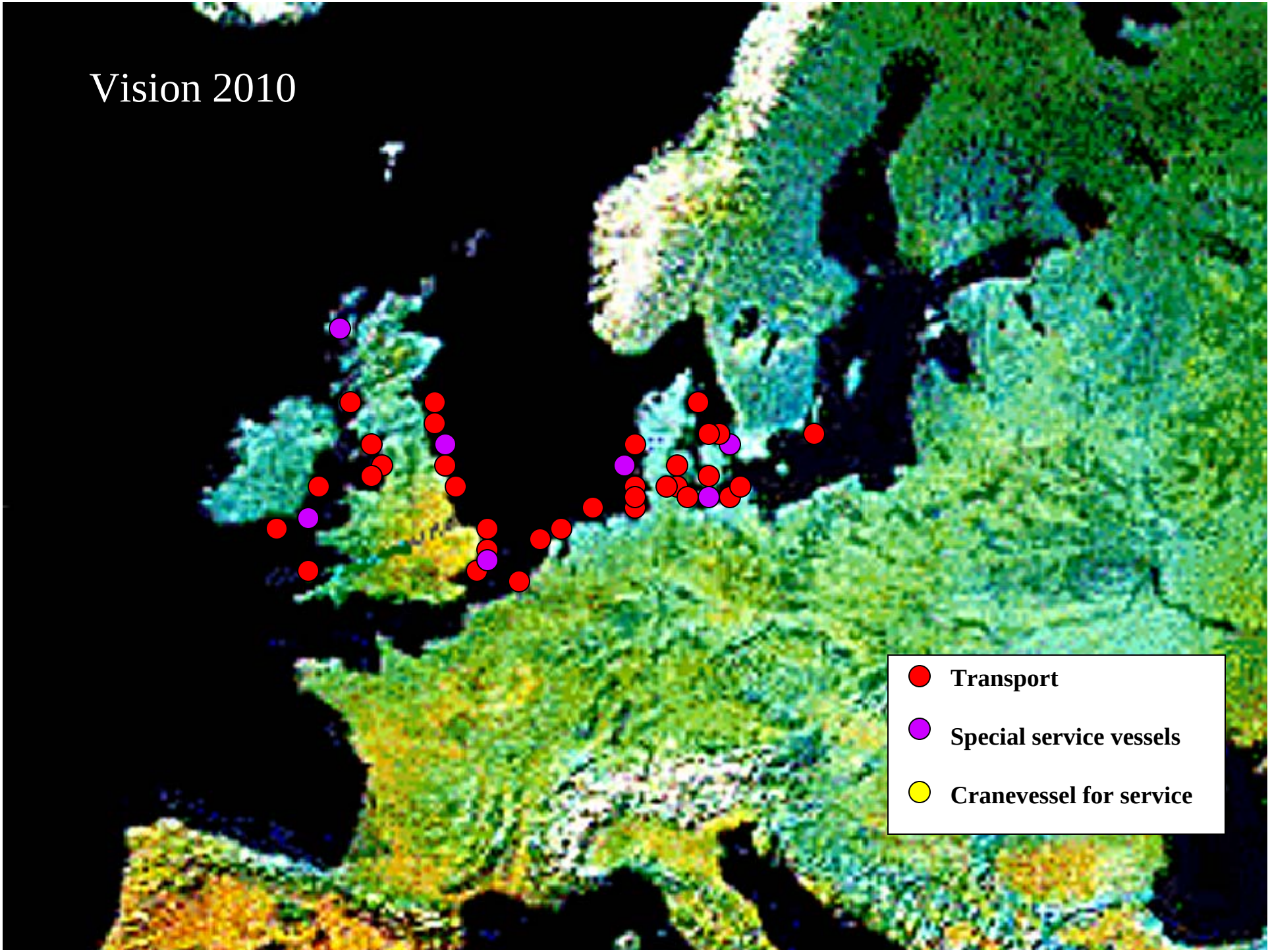
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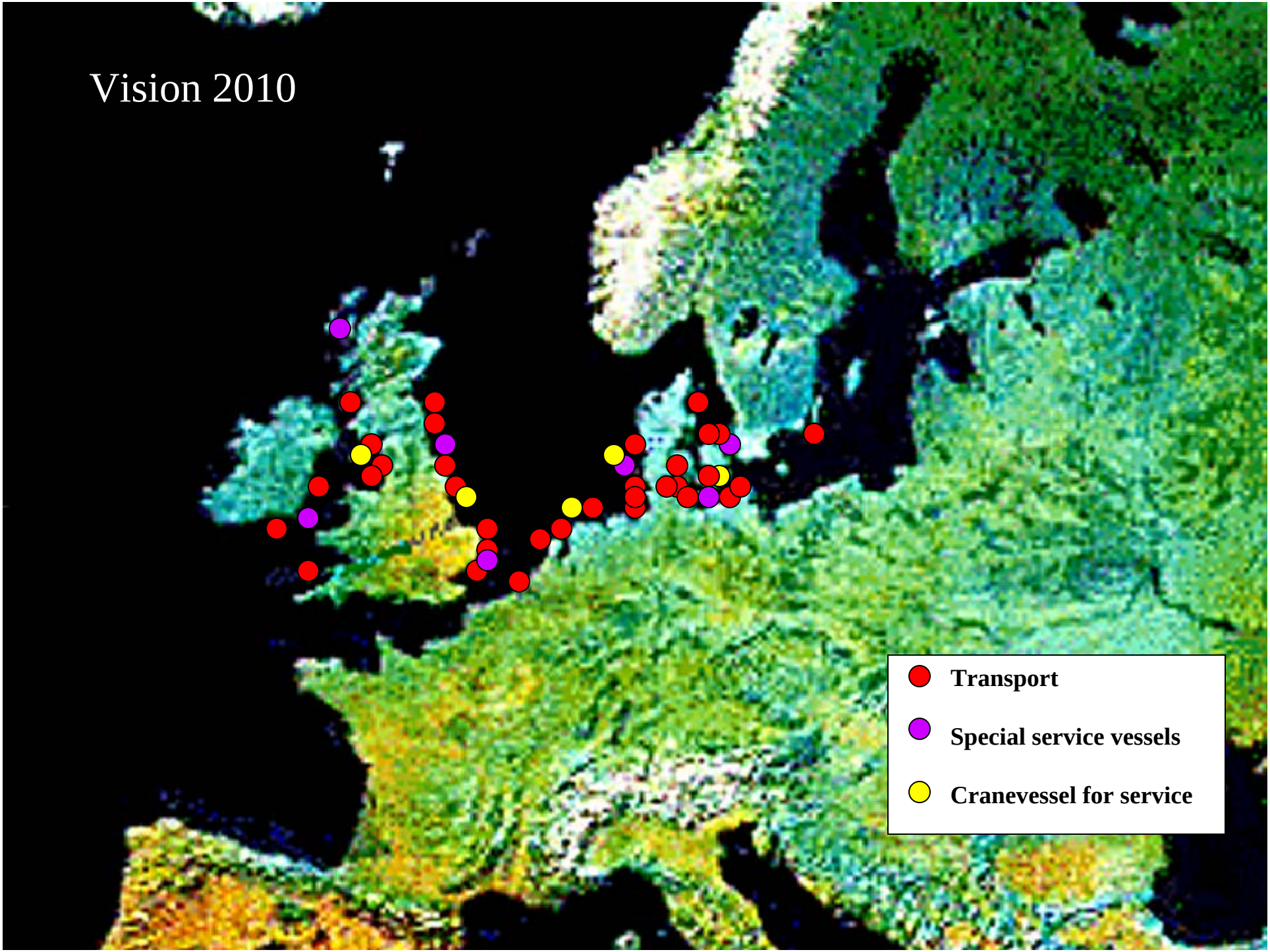
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Thank you for attending.